

Urban Heat Island Mitigation

FOR

DUMMIES

*A Reference for
Local Government
Policy Wonks!*



Tips for Putting Climate
Protection in Language
Officials Will Understand

Your Guide for Forging
Interdepartmental &
Community Partnerships



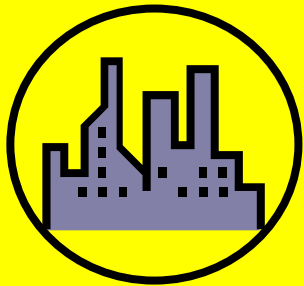
Icons Used in this Presentation



**Residential
application**



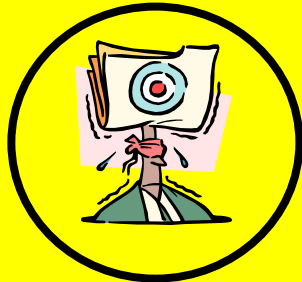
**Music to officials'
ears (things they
understand)**



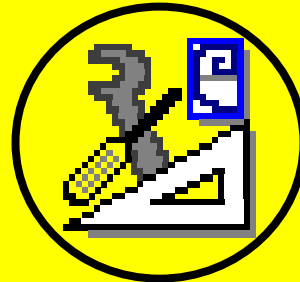
**City facility
application**



**Partnership
opportunities**



**Policy to
shoot for**



Tech stuff

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Heat Waves & Heat Related Deaths



Heat Health Watch Warning System - Developed by University of Delaware in conjunction with City Health Dept-now adopted by National Weather Service office for Phila area

ID offensive air masses (moist & dry tropical)

Level of Advisory (ER, Alert & Advisory)

Forecast heat index >105 issue warning



- Agency & Media Notification /Nursing &Personal Care /EMS staff
- Buddy System
- Heat Line # activated
- Inspection of group homes /Home Visits
- Senior Center hours expanded
- Halt utility terminations

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Heat Waves & Heat Related Deaths

Philadelphia's 3 "killer" heat waves in the last 10 years

- 118 deaths in 1993
- 61 deaths in 1995
- 67 deaths in 1999

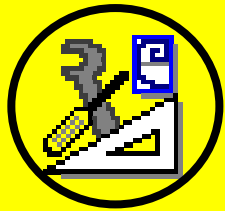


Cool Homes Program – Energy Coordinating Agency

- Reduce indoor air temp without increasing utility bills
- Maximize passive cooling & ventilation / Minimize A/C
- Reduce occupant health risk
- Reduce utility delinquencies / terminations
- Extend Roof Life / reduce C&D landfill waste
- Improve Indoor AQ

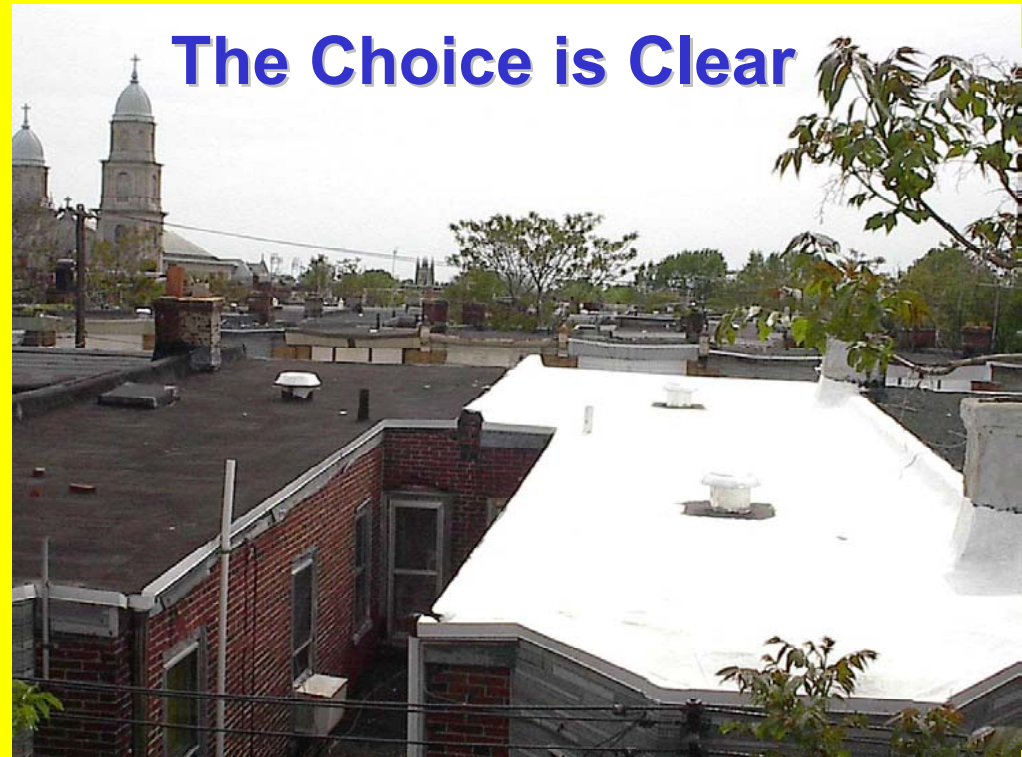


Cool Homes Cont.



Rx: White, acrylic elastomeric roof coatings

- R-38 insulation
- Air sealing
- Window mounted whole house fan
- Restore function of windows - window security, screens & shades
- Weatherization and other referrals



Cool Homes Cont.

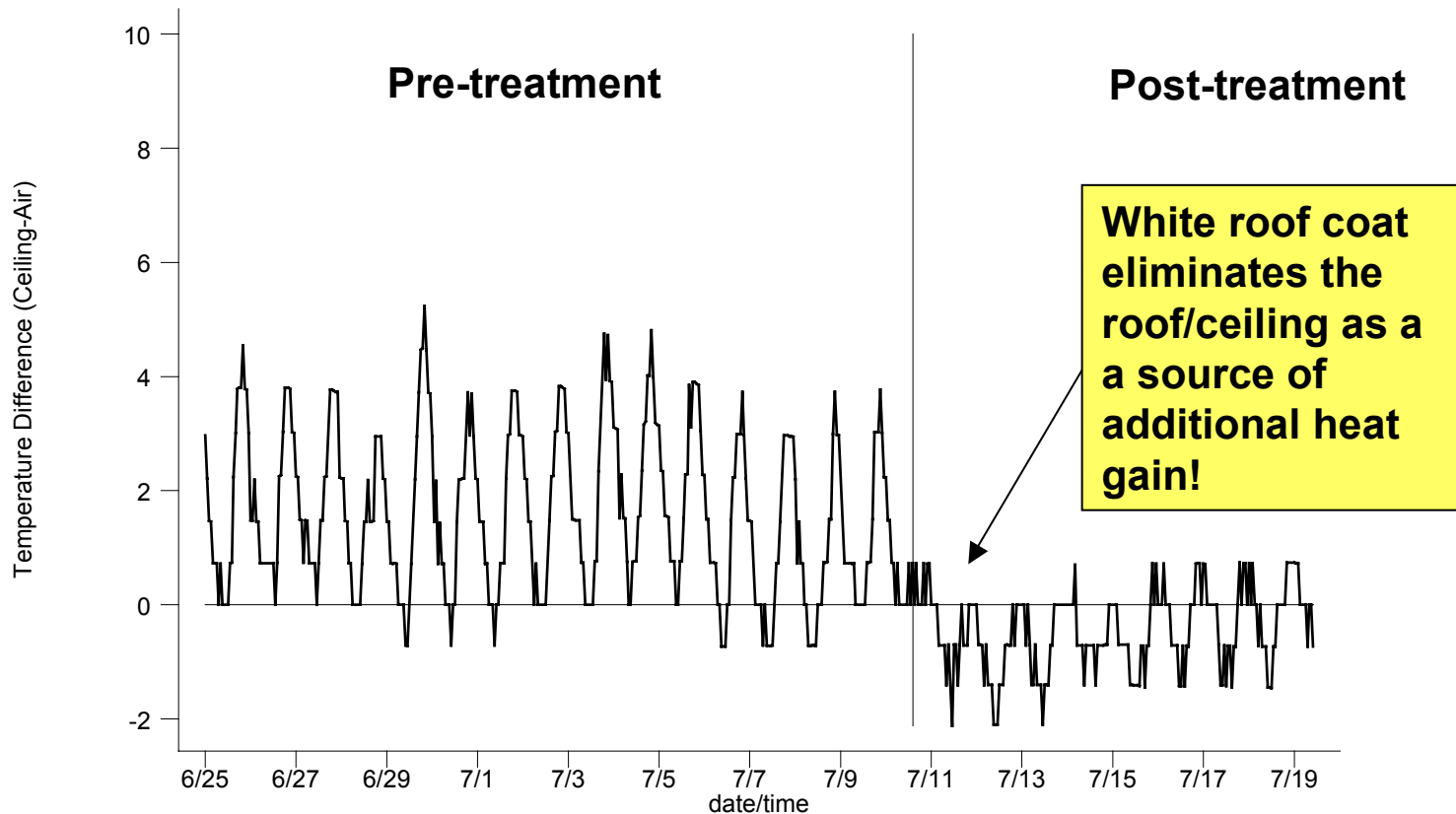


Independent Evaluation

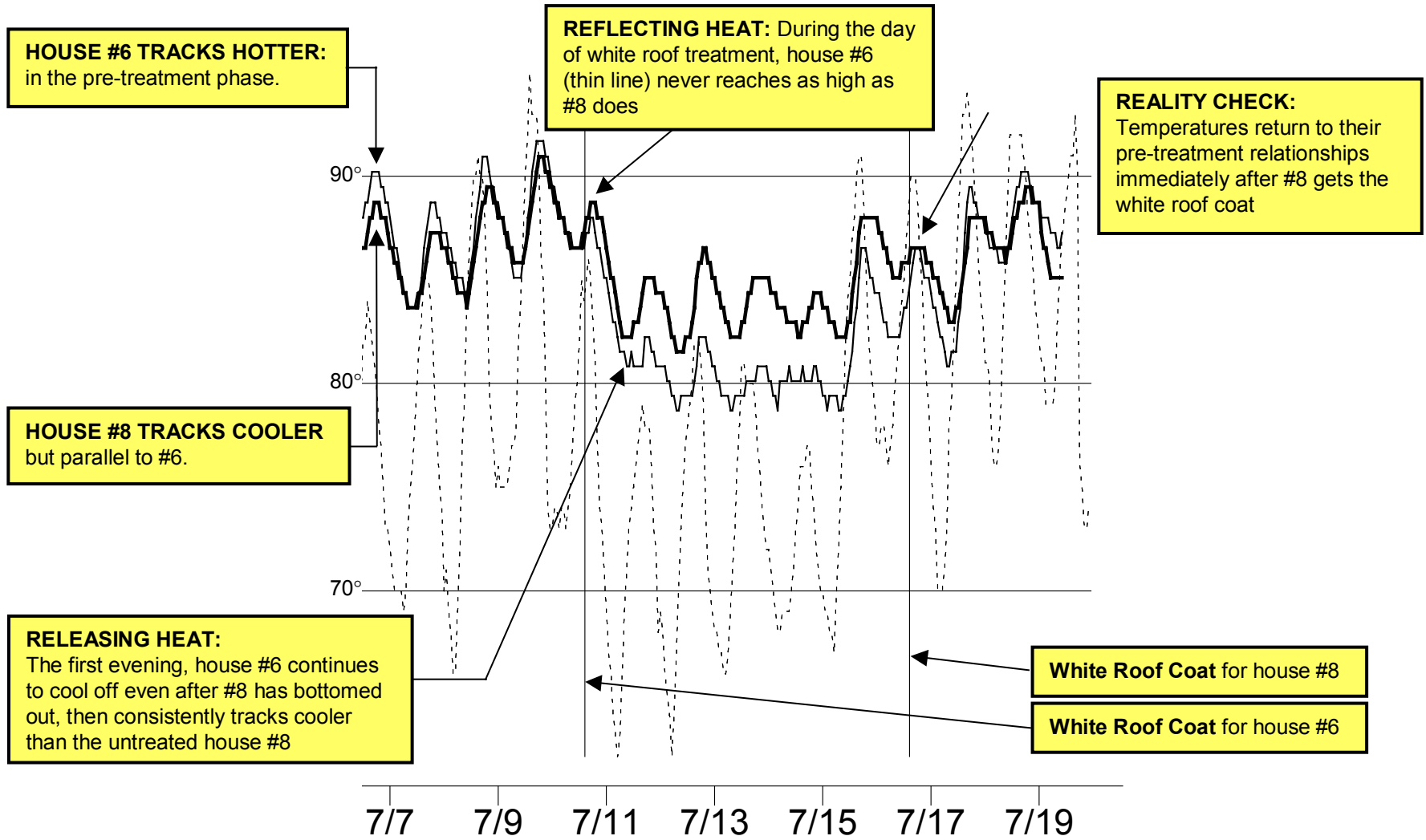
- Data loggers in 35 houses - pre & post monitoring on 1st and 2nd floors
- Coatings are nearly eliminating the impact of solar heat gain through the roofs (80% reduction)
- Indoor ceiling temps were reduced by approx. 5 degrees on hot days & bedroom air temp by approx. 2.5 degrees
- Temperature change should reduce daily cooling loads by about 30,000 Btus – or the equivalent of nearly 4 hours continuous runtime for a typical 8000/Btu/hr window air conditioner

Temperature Differences

Between Ceiling and Air in house #6



Tracking the Effects



Tracking the effects of white roof coating on two identical homes

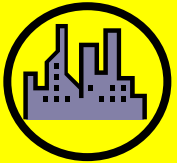
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Operation & Maintenance Savings

Elastomeric Coating Incentives

- Extend roof life by 5 – 10 years and longer if recoating occurs at regular intervals



- Citywide Contract for Cool Roof Materials

Roof Coating

- \$.35/sq.ft. for materials (base coat + white coat)

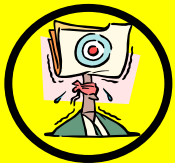
Reinforced system

- \$1.20/sq.ft for materials



- Energy Office rebates

- \$.20/sq.ft



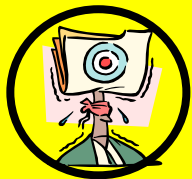
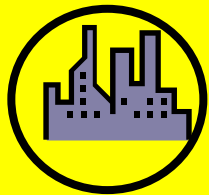
Future - Executive Order for City facility?

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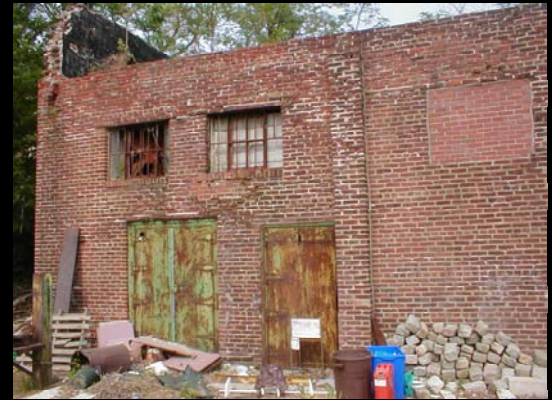


Stormwater Management

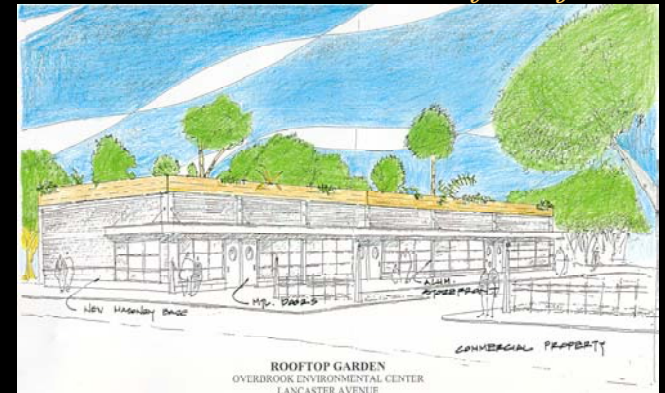
- Low-impact site design for City's model green building (parking lot swales, light colored paving & trees)
- Green Roof Pilot
- Water Department – future rate structure may include incentives for low-impact site design



Brownfield Reclamation



OCC Energy Conservation - Green Roof Project



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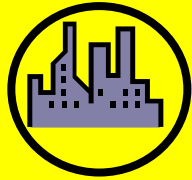


Resource & Energy Efficiency

- **High Performance Green Building Renovation Guide**



- 12 sections coincide with typical renovation topics
- Structured to address scale of importance, material & system options, including an economic indicator, benefits and life cycle assessment



- Matrix highlights section interconnection
- Moving toward design integration

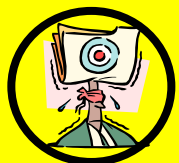
- **3 LEED rated capital projects**

- **Delaware Valley Green Building Council**



- Building the Town Green

- **Future:**



- Capital Program Design RFP modifications
- GTI Sustainable Energy Plan

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Community Development

Livable Neighborhood Program



- Block-by-Block Community Empowerment Program
- 5 Sections (Health & Safety / Beautification & Greening / Resource Sharing / Neighborhood Building / Energy)



- UHI integrated in:
 - Beautification & Greening – strategic planting (future)
 - Energy – cool homes program & 1 Cool Block contest
- Utility bill reductions as neighborhood stabilization effort / affordable comfort

Solutions for Progress

- Rebuild America/Cooling Workshops

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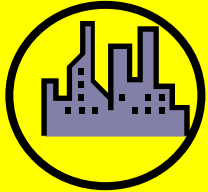
School Beautification

Campus Parks – UHI Mitigation Opportunity

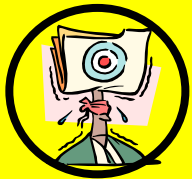


- Green Schools – ASE

Integrate UHI materials into curriculum
(grant secured)



Students involved in plant selection and site
design



- Model Cool Schools

Direct Hit



ICLEI

Cities for Climate Protection: GHG emissions inventory

- **Base Year 1990 = over 14,000,000 tons of carbon dioxide emissions**
- **Projected 2010 emissions = just over 13,000,000 tons CO₂ (5-6% reduction based solely on declines in population and manufacturing)**

Direct Hit

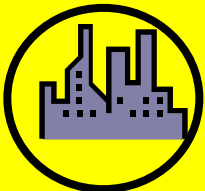
City's ICLEI Goal – 10 % reduction of 1990 CO2 emissions level by 2010



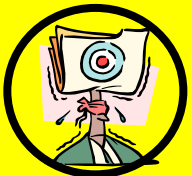
- Increase use of alternative fuels
- Apply reflective, white roof coatings on appropriate city facilities.
- Continue fleet downsizing and conversion to more fuel-efficient vehicles.



- Recruit approximately 500 additional City employees to use mass transit by 2010, possibly through Transitcheck.

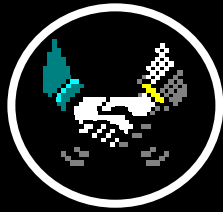


- Continue energy efficient building measures
- 15% increase in bicycle use
- Increase telecommuter numbers in the region to 66,500 by 2010.



6-city UHI Peer Exchange

Future: LNP Low-Carb Diet



Partnerships

- Energy Office
- Water Department
- Capital Program Office
- Building Services
- Health Department
- Managing Director / Budget
- Open Space Committee
- NTI
- ICLEI
- DVGBC
- Green Schools
- School District
- Solutions for Progress
- EPA -Energy Star
- DOE – Rebuild America
- PADEP